

**Department of Higher Education, Govt. of M.P.**  
**Under Graduate Syllabus for B.Sc.(Bio) 3 years**  
**As recommended by Central board of Studies in Zoology**

**B.Sc. II Year**  
**Subject : Zoology**  
**Session 2021-22**

**Scheme of Examination**

Paper	Topic of Paper	Theory		Internal Assessment		Total marks
		Max.Marks.	Min.Marks.	Quarterly Exam	Half yearly Exam	
<b>I</b>	Vertebrate and Evolution	40	13	10	10	<b>100</b>
<b>II</b>	Animal Physiology and Biochemistry	40	13			
	Practical	50	17			<b>50</b>

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<b>Class</b>	- B.Sc. II year
<b>Paper</b>	- I
<b>Subject</b>	- Zoology
<b>Title of Paper</b>	- Vertebrate and Evolution
<b>Max. Marks:</b>	- 40

**Unit-1**

1. Origin of Chordates.
2. Classification of Phylum Chordata upto orders according to Parker and Haswell (Latest edition).
3. Urochordata - Type study of Herdmania - Morphology, Digestive System, Circulatory System, Excretory System, Nervous System and Reproductive System.
4. Cephalochordata - Type study of Amphioxus- Morphology, Digestive System and Respiratory System, Affinities of Amphioxus.
5. Comparison between Petromyzon and Myxine.

**Unit-2**

1. Comparative account of integuments and its derivatives (Fish, Amphibia, Reptiles, Aves and Mammals)
2. Comparative account of limb bones and girdles (Fish, Amphibia, Reptiles, Aves and Mammals)
3. Comparative account of digestive system (Fish, Amphibia, Reptiles, Aves and Mammals)
4. Comparative account of respiratory system (Fish, Amphibia, Reptiles, Aves and Mammals)

**Unit-3**

1. Comparative account of aortic arches and heart (Fish, Amphibia, Reptiles, Aves and Mammals).
2. Comparative account of brain (Fish, Amphibia, Reptiles, Aves and Mammals).
3. Comparative account of urinogenital system (Fish, Amphibia, Reptiles, Aves and Mammals).
4. Sense organs (Eye and Ear) of Mammals
5. Placentation in mammals

**Unit-4**

1. Origin of life- Modern concepts only.
2. Lamarckism and Darwinism, De vries
3. Modern synthetic theories: Variations, Mutation, Isolation & Speciation.
4. Adaptation (Aquatic, Aerial, Desert & Arboreal).
5. Mimicry.
6. Micro, macro and mega evolution.

**Unit-5**

1. Fossils, methods of fossilization, determination of age of fossils.
2. Study of extinct forms: Dinosaurs wsr. Brontosaurus, Stegosaurus and Archaeopteryx.
3. Zoogeographical distribution: Palaearctic, Oriental and Australian region
4. Evolution of man.
5. Geological time scale
6. Insular fauna wsr Wallace's line and Weber's line

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<b>Class</b>	- B.Sc. II year
<b>Paper</b>	- II
<b>Subject</b>	- Zoology
<b>Title of Paper</b>	- Animal Physiology and Biochemistry
<b>Max. Marks:</b>	- 40

**Unit I: Nutrition and Metabolism**

1. Physiology of digestion in mammals
2. Protein Metabolism: Deamination, Decarboxylation. Transamination of amino acids, and Ornithine Cycle.
3. Carbohydrate metabolism- Glycogenesis, Glycogenolysis, Glycolysis, Citric acid cycle, Gluconeogenesis.
4. Lipid Metabolism-Beta oxidation of fatty acids.

**Unit II: Respiration Excretion and Immune System**

1. Mechanism and physiology of respiration in mammals (Transport of Gases, Chloride Shift).
2. Physiology of Excretion- urea and urine formation in mammals
3. Osmoregulation and excretory product.
4. Innate and Acquired immunity.
5. Immune Cells and Lymphoid system
6. Immune response: Cellular and Humoral Immunity.

**Unit III: Regulatory Mechanisms of Enzymes and role of vitamins**

1. Thermoregulation.
2. Definition, nomenclature and classification of enzymes.
3. Mechanism and regulation of enzyme action.
4. Co-enzymes wsr Co.A, FAD,NAD and Co.Q
5. Vitamins

**Unit IV: Neuromuscular Co- ordination**

1. Types of neurons and glial cells
2. Physiology of nerve impulse conduction.
3. Types and structure of muscles
4. Theory of muscle contraction and its biochemistry.

**Unit V: Endocrine system**

1. Structure and functions of Pituitary Gland.
2. Structure and functions of Thyroid Gland.
3. Structure and functions of Adrenal Gland.
4. Structure and functions of Parathyroid, Thymus and Islets of Langerhan's.
5. Endocrine role of male and female gonads wsr physiology of sex hormones.

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**Class** - B.Sc. II year  
**Subject** - Zoology Practical  
**Max. Marks:** - 50

1. Dissection of commercially available species and locally available fishes (Efforts may be done to use computer simulation techniques)
2. Study of museum specimens (Vertebrates)
3. Study of specimens of evolutionary importance viz. living fossils, connecting links, extinct animals, fossils, Limulus Latimeria, Dinosaurs, Asiatic Chital, Archeopteryx, Peripatus etc.
4. Osteology: Limb bones and girdle bones of Frog, Varanus, Pigeon and Rabbit.
5. Detection of Protein, Carbohydrate and Lipid/ Study of Human salivary enzyme activity in relation to pH.
  
6. Haematological Experiments – RBC and WBC Counting /Blood grouping in blood samples/ Estimation of Haemoglobin and sugar in blood samples.
7. Histological study of various endocrine glands –T. S. of Thyroid, T. S. of Pituitary gland, T. S. of Adrenal gland, T. S. of Testis, T. S. of Ovary.
8. Histological study of Digestive and Visceral Organs – T.S of Stomach, T.S of Intestine, T.S of Pancreas, and T. S. of liver, T.S of Lungs and L.S. of Kidney.
9. Semen analysis and exercise on sperm count.
10. Serological tests - ELISA Reader
11. Comparative biochemical analysis of evaporated milk samples using Rotary Vacuum Evaporators.

**Scheme of Practical Examination**

**Distribution of Marks**

1. Dissection	06
2. Spot related to evolution	04
3. Spotting (4 Specimen, 2 bones, 2 slides).	16
4. Biochemical tests/ enzyme activity/ semen analysis	05
5. Hematological experiment/Serological	05
6. Viva-Voce	04
7. Record	05
8. Collection	05
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Total	50 Marks
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## Recommended books for B.Sc. II year – Zoology

### Books of M.P. Hindi Granth Academy

1. Parker & Haswell : Textbook of Vertebrate Zoology
2. Kotpal R.L. : Vertebrate
3. Jordan E.L. & Verma P.S. : Chordate Biology
4. Rastogi, V.B. : Organic Evolution
5. Singh and Chaturvedi : Organic Evolution
6. Ernst W. Mayr : Evolution and Diversity of Life
7. Colbert : Evolution
8. Verma P.S & Agrawal V.K. : Cell Biology ,Genetics ,Molecular Biology& Evolution
9. Verma P.S : Animal Physiology
10. Nigam H.L. : Animal Physiology
11. Wood D.W. : Principals of Animal Physiology
12. Berry A.K. : Animal Physiology and Biochemistry
13. Proser C.L. : Comparative Animal Physiology
14. Goyal & Shashtri : Animal Physiology
15. Shrivastava H.S. : Biochemistry
16. Lehninger : Biochemistry